Accelerated Numerical Processing API Based on GPU Technology, Phase I

Completed Technology Project (2007 - 2007)

Project Introduction

The recent performance increases in graphics processing units (GPUs) have made graphics cards an attractive platform for implementing computationally intense applications. With their numerous parallel computational pipelines and SIMD architecture, modern GPUs can outperform high-end microprocessors by one to three orders of magnitude, depending on the problem. Most work to date at EM Photonics and elsewhere has focused on accelerating specific applications by porting core engines onto the GPU. In this project, we propose the development of general purpose computational libraries capable of solving numerous core numerical functions on commodity graphics cards. These solvers will be based on accepted, industry-standard interfaces and will be easy to integrate with current and future applications. The result will be a GPU-based numerical coprocessor capable accelerating a wide range of computationally intense functions, thereby reducing processing times in applications where numerical computations are the primary bottleneck.

Primary U.S. Work Locations and Key Partners
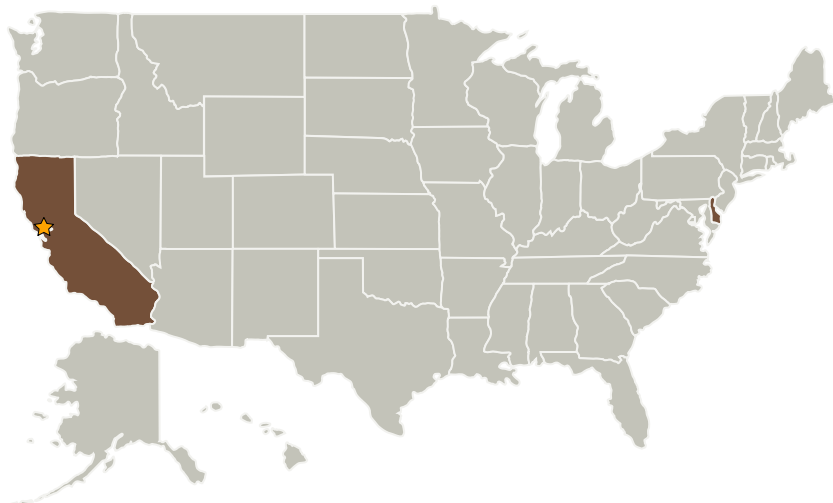
Organizations Performing Work	Role	Type	Location
⭐Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
EM Photonics, Inc.	Supporting Organization	Industry	Newark, Delaware

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

For more information and an accessible alternative, please visit: https://techport.nasa.gov/view/6684

Primary U.S. Work Locations	
California	Delaware

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX11 Software, Modeling,
  Simulation, and Information
  Processing
  └ TX11.6 Ground Computing
    └ TX11.6.2 Automated
      Exascale Software
      Development Toolset